

REMARKS

Claims 1-23 are pending.

Claims 1-23 are rejected.

Claims 1, 4 and 23 are amended.

date:

Specification

Examiner objects to the specification but fails to state what the objection is.

35 USC 112, second paragraph

Claims 1-23 are rejected under 35 USC 112, second paragraph.

Claim 1 has been amended to eliminate the phrase "is assisted" and now reads wherein the solids-liquid separation stage is characterized by a treatment system which comprises an anionic polymer....

Claim 4 has been amended to remove "preferably".

Claim 23 has been amended to eliminate "and amino acids such as".

et al.

Applicants believe the above amendments correct all the 112, second paragraph rejections.

No new matter has been added.

35 USC 103(a)

Claims 1-3, 11, 20, 22 and 23 are rejected under 35 USC 103(a) as being unpatentable over Brink, US 5,536,325 in view of Minowa publication "the Characteristics of Dewatering Ethanol Fermentation Stillage".

Applicants disagree that Brink (US 5,536,325) discloses a process for separating suspended solids from a fermentation liquor and that the liquor removed from the distillation stage would comprise lignin.

First of all, Brink discloses a process wherein the hydrolysate obtained from lignocellulosic material has already been separated from insoluble biomaterial such as lignin, before said hydrolysate is

neutralized and separated from contaminants resulted from neutralization and finally subjected to a fermentation stage. The separation of insoluble biomass including lignin from the liquid hydrolysate is evident from col. 5, lines 58-62 and fig. 4, where the solids remaining after the second hydrolysis step are separated by centrifugation and subjected to wet oxidation. Likewise, another passage referring to fig. 1 describes that the slurry obtained in the stage II hydrolyser is subjected to several separators, and finally the solids, consisting primarily of lignin may be subjected to wet oxidation (cf. fig. 1, col. 4, lines 25-51). Also, referring to fig. 7 in connection with col. 16, lines 54-64 and col. 17, lines 2-14 and line 59 disclose that insoluble matter, i.e. lignin, is removed before fermentation. Col. 14, lines 36-38 confirm that the wet oxidation step serves to break down lignin. That is, the fermentation liquor does clearly not comprise lignin, contrary to the fermentation liquor of the present process.

Secondly, the solids-liquid separation stage referring to fig. 4 of Brink using ferric and aluminum salts as flocculants is carried out with a neutralized mixture, as mentioned above. Therefore, the flocculating agents are not applied to a fermentation liquor according to the present invention comprising lignin.

Finally, at the stage of fermentation in Brink there is neither a disclosure nor a suggestion how the solids-liquid separation of the fermentation liquor is carried out; it is only stated that the components such as yeast and CO₂ leave the system through different lines (cf. 6, lines 15-18). Also, the reference does not mention any use of a treatment system and least of all the specific treatment system as claimed in the present application.

Minowa et al. describes the use of a polymeric coagulant in dewatering of a fermentation stillage obtained from buckwheat or rice, wherein a cationic one is effective for high water permeability and an anionic one is effective for fast sedimentation.

Therefore, it is not obvious to one skilled in the art to modify the process of Brink by applying an anionic polymeric coagulant, as disclosed by Minowa, to arrive at the instant invention. And even if a skilled person employed an anionic polymeric coagulant to a fermentation liquor obtained by Brink, one would obtain a process wherein the fermentation liquor is already freed from lignin.

Hence, the present invention is not rendered obvious by Brink and Minowa.

Claims 4-10 and 12-19 are rejected under 35 USC 103(a) as being unpatentable over Brink in view of Minowa (as above) and further in view of Moffett US 6,132,625.

Moffett (US 6,132,625) relates to a process of separating biosolids from an aqueous stream resulting from animal or vegetable processing operations using as flocculants an anionic inorganic colloid and a cationic polymer having a molecular weight greater than 1,000,000 (cf. claim 1). Here, the flocculants are added to a biosolids containing aqueous stream which is quite different to a fermentation liquor comprising lignin as well as BOD according to the present application (cf. page 6, lines 1-3 and page 7, lines 17-18).

As discussed above, the process according to claim 1 is not rendered obvious by Brink alone or in combination with any other reference, especially combined with Minowa. As Moffett does neither teach nor suggest applying the flocculants to a fermentation liquor comprising lignin one skilled in the art would not consider this reference at all.

Hence, the subject-matter of claims 4-10 and 12-19 is not rendered obvious by Brink, Minowa and Moffett.

Claim 21 is rejected under 35 USC 103(a) as being unpatentable over Brink, Us 5,536,325 in view of the Minowa et al. publication “the characteristics of Dewatering Ethanol Fermentation Stillage” as above, and further in view of Chieffalo et al. US 5,975,439.

As already mentioned in the prior art of the present application Chieffalo et al. (US 5,975,439) relate to an automated process for producing ethanol shredding the cellulosic component of municipal solid waste and mixing this with equal amounts of concentrated sulphuric acid to provide a hydrolyzed mixture. At this stage, the solid by-product containing lignin is separated by filtration and the hydrolysate is subjected to fermentation (cf. col. 10, lines 49-53; col. 6, lines 40-49). Therefore, the fermentation liquor does not contain any lignin which may be separated and dewatered according to the present process.

In addition, there is neither a disclosure nor a suggestion to add flocculating agents, in particular an anionic polymer, to improve any involved solids-liquid separation process.

Double Patenting

Claims 1-23 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-19 or copending 10.523,301 and claims 1-22 of copending 10/587,583.

This is a provisional rejection. The Applicants request a delay in submitting a terminal disclaimer until all the other rejections have been overcome. At that time Applicants will know the state of the present claims and can reasonably evaluate the double patenting rejection.

Reconsideration and withdrawal of the rejection of claims 1-23 is respectfully solicited in light of the remarks and amendments *supra*.

Since there are no other grounds of objection or rejection, passage of this application to issue with claims 1-23 is earnestly solicited.

Applicants submit that the present application is in condition for allowance. In the event that minor amendments will further prosecution, Applicants request that the examiner contact the undersigned representative.

Respectfully submitted,



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